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A cable connector for electrical cable connections

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 **Invention Title:** A CABLE CONNECTOR FOR ELECTRICAL CABLE
CONNECTIONS

 The following statement is a full description of this invention, including the best
method of performing it known to us:-

competitive owing to their high price. Apart from this, the known cable connectors lack earthing.

5 It is an aim of the invention to avoid the disadvantages in cable connectors for electrical plug-in connections and by simple means to produce a cable connector suitable for long term application in wet surroundings, such as the water spray regions in underground mining.

10 Accordingly, the present invention is directed to a cable plug connector as described in the opening paragraph of the present specification, in which a multiple cornered part of metal provided with a through boring for the cable is screwed into the cable entry opening and the cable is fastened in a sealing manner, by means of a formed part formed on the cable covering, to the connector shell and to the multiple cornered part. By the conformation of a suitably formed part an extremely high protection against the
15 ingress of moisture into the interior of the plug shell is produced. The advantages of the formed part comprise inter alia that it caters to a certain extent as a sealing body for the sealing of the cable to the plug shell and the cable entry opening. Since sealing imperfections owing to assembly deficiencies are excluded, quality control of the plug according to the invention can also be performed during the production of the plug-in
20 connector, i.e. immediately following the conformation of the formed part from permanently elastic material. The multiple cornered part of metal, which touches the metal connector shell at the thread surfaces, effects at the same time a secure earthing of the cable.

25 Preferably the multiple cornered part is provided with threaded sections on its corner edges, so that the flat sides between the corner edges remain of flat construction. With the multiple cornered part screwed in several hollow spaces arise between the outer surface of the multiple edged part and the inner surface of the cable entry opening, into which cast masses of the formed part can penetrate. Preferably the through boring of the
30 multiple cornered part has an indentation, whereby preferably the cable side boring section has a boring diameter which is larger than the diameter of the cable covering. In the intervening space thus created between the cable covering and the multiple cornered part the armouring or screening of the cable, which is turned back over the cable end when the

The formed part can preferably comprise a permanently elastic cast or injection moulded body of a suitable plastics material.

Advantageously, the connector shell, the multi-cornered part and/or the clamping sleeve comprise brass.

An example of a cable connector made in accordance with the present invention will be described in greater detail herein below with reference to the accompanying drawing, in which:

FIG. 1 shows a sectional view of a non-assembled electrical plug-in connector, for equipment in underground mining, which is formed from a cable plug and a socket part;

FIG. 2 shows an end view of a four cornered part of the cable connector according to the present invention; and

FIG. 3 shows a sectional view of a clamping sleeve for the cable connector according to the present invention.

A plug-in connector 10 is shown in the drawing, which serves for the connection of a cable 1 for instance to an electro-hydraulic support controller, not shown in detail, such as are in multiple application in underground mining.

The plug-in connector 10 essentially comprises a socket part 2 and a cable plug 3. The cable plug 3, which forms the termination of the cable 1, has a hollow connector shell 4 of brass. The cable side section of the boring of the connector shell 4 forms a cable entry opening and has an abutment collar or engaging portion 5, onto which a plug connector 6 of plastics material with a collar 6' is supported axially in one direction. In the embodiment shown the plug connector 6 is supported on the socket side on the abutment collar or engaging portion 5. Alternatively the plug connector can also be supported on the cable side on an abutment collar or engaging portion, i.e. the plug connector is also then pushed into the plug shell through the cable entry opening. The plug connector 6 has, as is familiar, plug pins and/or sockets 7, whereby individual conductor wires 23 of the cable 1 are connected with the sockets 7 in the plug connector 6. In the assembled condition (not

means of the indentation 36 to a through hole 37, whose clear opening width is smaller than the cable diameter D (FIG. 1). A cable-receiving end boring section 38 of the four cornered part 30 has a diameter B, which is a few mm larger than the cable diameter. The boring section 35 comprises the through hole 37 and, adjacent thereto, a boring section 38 which is of larger diameter than the hole 37, and which leads to a boring end 39 of a further enlarged diameter, so that the clamping sleeve 45, shown in FIG. 3 can be pushed in between the cable covering 1' and the boring sections 38, 39 in the four cornered part 30. The clamping sleeve 45, of brass has a ring body 46 and a ring collar 47.

FIG. 1 shows the assembly condition of the plug shell 4, the four cornered part 30, clamping sleeve 45, cable 1 and plug connector 6. For assembly the conductor wires 23 and the armouring 24 of the cable 1 are first released and the conductor wires 23 are passed through the through hole 37 in the four cornered part 30. The armouring 24 is thereby clamped in between the cable covering 1' and the boring section 38, so that the cable 1 is earthed to the brass four cornered part 30. After the conductor wires 23 are joined to the plug-in sockets 7 in the plug connector 6, the four cornered part 30 is screwed into the internal thread 22; hereby full earthing is effected owing to the metallic connection between the armouring 24, the four cornered part 30 and the connector shell 4. The length of the internal screw thread 22 extends only over a partial section of the cable entry opening, so that the four cornered part 30 can be screwed self-locking into this. The length of the four cornered part 30 itself is longer than the length of the internal thread 22.

The clamping sleeve 45 with the ring collar 47 is pushed into the component pre-assembled in this manner from the rear side, i.e. from the cable entry end 21, into the boring section 38 and retained by a fixing band 48. The clamping sleeve 45 supports the axial fixing of the cable 1 in the connector shell 4 with its deeply pushed in ring collar 47. After an O-ring 26 is attached at the prescribed distance from the cable entry end 21, a formed part 27 can be formed by casting or injection moulding from suitable plastics material, for instance using two half shells, surrounding the end of the connector shell 4. A part of the plastics material hereby also penetrates into the intervening space between the flat sides 32 of the four cornered part 30 and the internal thread 22 as well as further between the cable end boring section 39 and the indentation 36 of the four cornered part 30 and through the through hole 37 into the plug connector 6. This is achieved by only one injection process and leads inter alia to adhesion of the injected material to the plug

The claims defining the invention are as follows:

1. A cable plug connector for electrical cable connections, especially for plug-in couplings of electrical cable connections in underground mining, with a connector shell of metal, which has a cable entry end and a cable entry opening therein, said opening
5 provided with an internal thread and an abutment collar or engaging portion for a plug connector of plastics material, which is equipped with plug pins and/or sockets, which are joined to the cable conductors of a single or multi-connector cable, which is provided with screening or armouring, a multiple cornered part of metal being provided with threaded
10 sections on its corner edges and also provided with a through boring for the cable, wherein the multiple cornered part is screwed into the cable entry opening of the connector shell such that the threaded sections of the corner edges engage the internal thread of the connector shell and the cable is fastened in a sealed manner, by means of a formed part formed on the cable covering, to the multiple cornered part and to the connector shell.
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2. A cable plug connector according to claim 1, in which the through boring of the multiple cornered part has an indentation, whereby an end of the boring at the cable entry end has a bore diameter which is larger than the diameter of the cable covering.
- 20 3. A cable plug connector according to claim 2, in which the clamping sleeve is retained on the cable covering by a fixing band prior to the forming of the formed part.
4. A cable plug connector according to claim 1, in which a clamping sleeve is pushed into an end of the boring at the cable entry end.
- 25 5. A cable plug connector according to claim 1, in which the exposed armouring or screening of the cable is accepted between of the multiple cornered part and the cable covering.
- 30 6. A cable plug connector according claim 1, in which the length of the multiple cornered part is some 3 to 7 mm longer than the internal thread in the cable entry opening and/or the thread extends only over a partial section of the cable entry opening which is on the cable entry end.

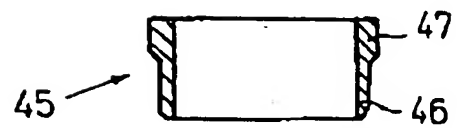
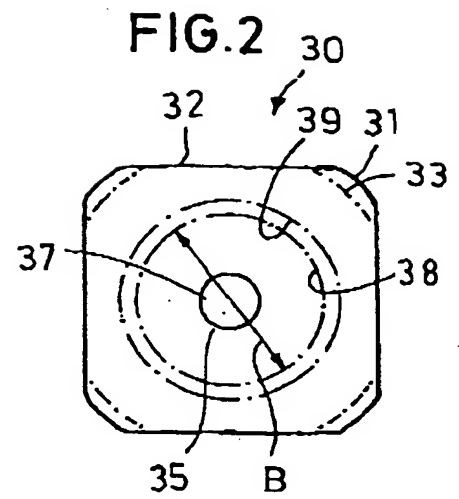
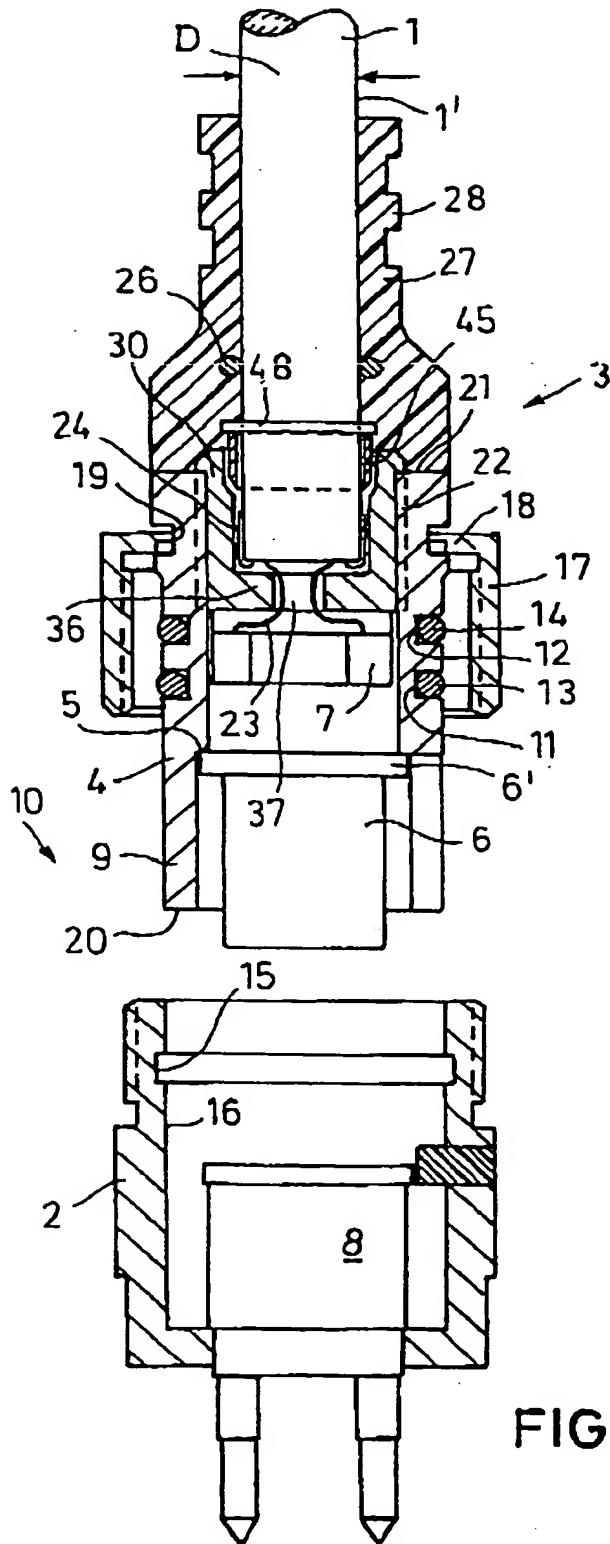


FIG. 3

FIG. 1